

CLAIMS

1. Process for improving the physicochemical properties of bitumen, characterized in
5 that a sufficient amount of polymer powder is added to the bitumen composition, the said powder having a particle diameter of between 1 and 150 μm .

2. Process according to claim 1, characterized in that the polymer powder is prepared
10 from at least one ethylenically unsaturated monomer, which may be chosen from styrene, butadiene, $\text{C}_1\text{-C}_{12}$ alkyl acrylic and/or methacrylic esters, vinyl esters, acrylamide and/or methacrylamide, and $\text{C}_1\text{-C}_{12}$ alkyl derivatives thereof.

15 3. Process according to either of claims 1 and 2, characterized in that the polymer powder is prepared from monomer comprising at least styrene and butadiene.

4. Process according to any one of claims 1
20 to 3, characterized in that the polymer powder is prepared from at least one additional monomer containing one or more functional group(s) chosen from carboxyl, acid anhydride, hydroxyl, amide, amino and glycidyl groups.

25 5. Process according to any one of claims 1 to 4, characterized in that the polymer powder is prepared from at least one additional monomer chosen

from acrylic acid, methacrylic acid, fumaric acid, itaconic acid, crotonic acid, maleic acid, maleic anhydride, mesaconic acid and glutaconic acid, or mixtures thereof.

5 6. Process according to any one of claims 1 to 5, characterized in that the polymer powder is prepared from at least styrene, butadiene and acrylic acid monomers.

 7. Process according to any one of claims 1
10 to 6, characterized in that the polymer powder is prepared from a mixture of monomers comprising 92% to 99.9% by weight of at least one ethylenically unsaturated monomer, and 0.1% to 8% and more particularly 2% to 5% by weight of at least one monomer
15 containing a carboxylic function.

 8. Process according to any one of claims 1 to 7, characterized in that the polymer powder is prepared from a mixture of ethylenically unsaturated monomers chosen so as to obtain a polymer with a glass
20 transition temperature of between -40°C and $+35^{\circ}\text{C}$.

 9. Process according to claim 8, characterized in that the glass transition temperature is between -40°C and $+5^{\circ}\text{C}$.

 10. Process according to either of claims 8
25 and 9, characterized in that the glass transition temperature is between -40°C and $+1^{\circ}\text{C}$.

 11. Process according to any one of claims 1

to 10, characterized in that the polymer powder also contains a sufficient amount of a polypeptide containing from 2 to 100 amino acids.

12. Process according to claim 11,
5 characterized in that the polypeptide is chosen from sodium glutamate, sodium aspartate and sodium hydroxyglutamate.

13. Process according to either of claims 11 and 12, characterized in that the polypeptide is
10 incorporated in an amount of between 2 and 40 parts by weight per 100 parts by weight of polymer powder.

14. Process according to any one of claims 1 to 13, characterized in that the polymer powder also contains a sufficient amount of a water-soluble
15 compound (C) chosen from sugars and derivatives thereof and/or polyelectrolytes belonging to the family of weak polyacids.

15. Process according to any one of claims 1 to 14, characterized in that the polymer powder also
20 contains a sufficient amount of an amino acid (D) or derivatives thereof.

16. Process according to claim 15,
characterized in that the amino acid (D) or derivatives thereof are chosen from arginine, lysine, histidine,
25 glutamic acid, aspartic acid, hydroxyglutamic acid, sodium glutamate, sodium aspartate and sodium hydroxyglutamate.

17. Process according to any one of claims 1 to 16, characterized in that the polymer powder also contains a sufficient amount of a powdered mineral filler (F) with a particle size of less than 20 μm .

5 18. Process according to any one of claims 1 to 17, characterized in that the amount of polymer powder introduced into the bitumen composition is between 0.5% and 20% by weight of dry powder relative to the weight of the bitumen composition.

10 19. Process according to claim 18, characterized in that the amount of polymer powder introduced into the bitumen composition is between 0.5% and 10% by weight of dry powder relative to the weight of the bitumen composition.

15 20. Process according to either of claims 18 and 19, characterized in that the amount of polymer powder introduced into the bitumen composition is between 0.5% and 3% by weight of dry powder relative to the weight of the bitumen composition.

20 21. Process according to any one of claims 1 to 20, characterized in that the bitumen is chosen from natural bitumens, pyrobitumens and artificial bitumens, or mixtures thereof.

 22. Process according to claim 21,
25 characterized in that the bitumen is chosen from asphalt and maltha.

 23. Process according to either of claims 21

and 22, characterized in that the bitumen chosen is asphalt.

24. Process for improving the physicochemical properties of the bitumen composition, comprising the following steps:

- 1- the bitumen composition is heated to a temperature of between 140 and 190°C;
- 2- a sufficient amount of polymer powder with a particle size of between 1 and 150 μm is added to the bitumen composition of step 1 with stirring.

25. Bitumen composition that may be obtained by the process according to any one of claims 1 to 24.

26. Process for preparing hot mixes, characterized in that the process according to claim 24 is carried out, to which is added a step additional to the preceding process, which consists in adding, with stirring and at a temperature of between 140 and 190°C, aggregates to the bitumen composition.

27. Process for preparing cold mixes, comprising the following steps:

- 1- a sufficient amount of polymer powder is incorporated into a bitumen emulsion with stirring at room temperature;
- 2- the emulsion obtained in step 1 is spread onto a road to obtain a uniform layer of the mixture obtained in step 1;
- 3- the aggregates and fillers are spread on top of the

layer obtained in step 2, in the form of a uniform layer;

4- the bitumen emulsion is broken.

28. Process according to claim 27,
5 characterized in that the amount of polymer powder introduced into the bitumen composition is between 0.5% and 20% by weight of dry powder relative to the weight of the bitumen composition.

29. Process according to claim 28,
10 characterized in that the amount of polymer powder introduced into the bitumen composition is between 0.5% and 10% by weight of dry powder relative to the weight of the bitumen composition.

30. Process according to either of claims 28
15 and 29, characterized in that the amount of polymer powder introduced into the bitumen composition is between 0.5% and 3% by weight of dry powder relative to the weight of the bitumen composition.